

Modular Harsh Duty Limit Switch Style Sensor 3, 4-Wire DC, 3, 4-Wire AC Types



FEATURES

- Modular design – interchangeable heads and bases
- Top or side sensing, shielded or unshielded heads
- Three wiring options
 - Screw terminal
 - Prewired cable
 - 5-pin quick-connect
- Three base options
 - Plug-in
 - Mini
 - Relay
- UL listed, CSA approved

- Eight output options
 - 3-wire AC (mechanical relay)
 - 3-wire DC (mechanical relay)
 - 4-wire AC (solid state relay)
 - 4-wire AC (FET)
 - 3-wire DC (PNP single output)
 - 3-wire DC (NPN single output)
 - 4-wire DC (NPN dual output)
 - 4-wire DC (1 NPN, 1 PNP output)
- LED output indicator
- **Designed to meet NEMA 4 sealing, meets washdown criteria**
- All metals sensitive
- Uses same bases as standard MP photoelectric sensors

ORDER GUIDE, HEAD ONLY

Description	Catalog Listing
Top Sensing, shielded, 12,7 mm sensing distance	977TO1
Top Sensing, unshielded, 14,5 mm sensing distance	977TO2
Side Sensing, shielded, 12,7 mm sensing distance	977SO1
Side Sensing, unshielded, 14,5 mm sensing distance	977SO2

SPECIFICATIONS – SENSOR HEADS

Sensor type	Shielded, Top or Side	Unshielded, Top or Side
Sensing distance	12,7 mm (.50 in.)	14,5 mm (.57 in.)
Leakage current	10µA at 16 V	
Supply voltage	6-16 VDC	
Voltage drop	0.4 V max. @ 5 mA	
Load current	10 mA max.	
Repeatability	± 1%	
Hysteresis	2-15% of sensing distance	
Temperature range	–30 to +70 °C (–22 to 158 °F)	
Protection class	NEMA 1, 3, 4, 12, 13	
Circuit protection	False pulse, incorrect wiring	
Sensor material	Glass filled thermoplastic polyester, cadmium plated mounting screws	
Vibration	Double amplitude of 1,5 mm and frequency of 10 to 50 Hz applied to each direction of X, Y, Z for 2 hours	
Shock	Shock of 50 G applied each direction of X, Y, Z 10 times	

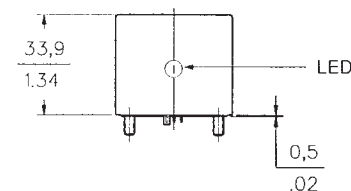
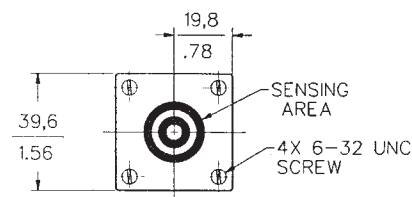
FOR A COMPLETE SENSOR:

1. Sensing head
2. Base—3 options
 - Plug-in base and receptacle. Page B55
 - Mini base (preleaded or connector). Page B57
 - Relay base. Page B59
 - Terminal style
 - Mini base (preleaded or connector).

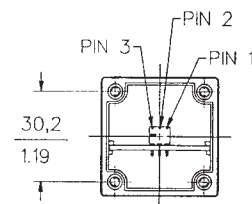
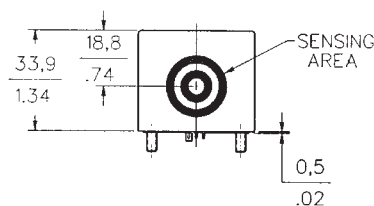
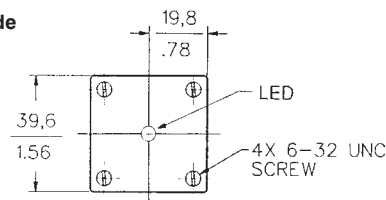
MOUNTING DIMENSIONS, SENSING HEAD

(For reference only)

Top



Side



Modular Harsh Duty Limit Switch Style Sensors

AC Plug-In Bases

AC PLUG-IN BASES (Require Receptacle)

Catalog Listing	MPS11HD	MPS12HD	MPS15HD	MPS17HD
Style	4-wire 110 VAC	4-wire 240 VAC	4-wire 24 VAC	4-wire 110 VAC AC/DC Output
Input Voltage	92 to 132 VAC 50/60 Hz	198 to 264 VAC 50/60 Hz	24 VAC ± 10% 50/60 Hz	92 to 132 VAC 50/60 Hz
Power Dissipation	10 VA max.	20 VA max.	2 VA max.	10 VA max.
Current Consumption	70 mA max.	70 mA max.	70 mA max.	70 mA max.
Output Type, N.O.	S.S. AC relay	S.S. AC relay	S.S. AC relay	Bilateral FET
Load Current	5 mA to 1 A	5 mA to 1 A*	5 mA to 1 A*	100 mA up to 50°C derated linearly to 20 mA at 70°C
Load Voltage	20 to 280 VAC	20 to 280 VAC	20 to 280 VAC	300 VAC/VDC max.
Load Surge Current	30 Amps max. for 8 msec (non-repetitive)	30 Amps max. for 8 msec (non-repetitive)	30 Amps max. for 8 msec (non-repetitive)	250 mA for 8 msec (non-repetitive)
Voltage Drop	1.4 VAC max. at rated load	1.4 VAC max. at rated load	1.4 VAC max. at rated load	3 V max. at 60 mA
Off-State Leakage Current	100 µAmps	100 µAmps	100 µAmps	10 µAmps max.
Electrical Protection	False pulse, line transients			

*Derated linearly to 0.75 amp at 70°C (158°F). 0.5 min. power factor. Max. dv/dt 600 V/µsec.
** NPN – current sinking, PNP – current sourcing

INTERFACING WITH PLCs

The bilateral FET output device (MPS17) is recommended for interfacing with PLCs, particularly where the holding current may drop below the 5 mA threshold required for conduction of the solid state relay.

RECEPTACLES

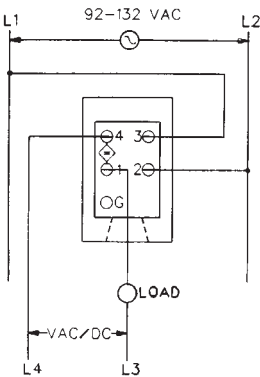
Description	Catalog Listing
Standard 4 terminal plug-in	MPB20
6 ft. 5 conductor preleaded plug-in	MPB21
5 pin mini style connector	MPB22

RECEPTACLE WIRING

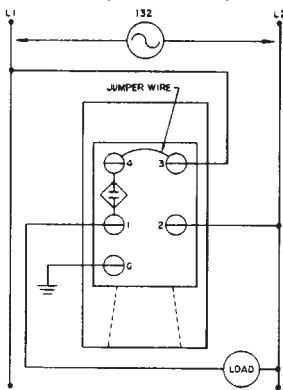
Refer to the wiring diagrams. The plug-in receptacle contains 5 internal screw terminals (4 sensor, 1 ground) for cable attachment (can accommodate up to #12 wire), no lugs required. Receptacle has 1/2"-14NPT threads.

Jumper wire is used for typical 3-wire AC operation (no internal connection in base).

MPS17HD AC/DC



MPS11HD, MPS12HD, MPS15HD



Proximity

Modular Harsh Duty Limit Switch Style Sensors

3, 4-Wire DC and 3, 4-Wire AC

DC PLUG-IN BASES (Require Receptacle)

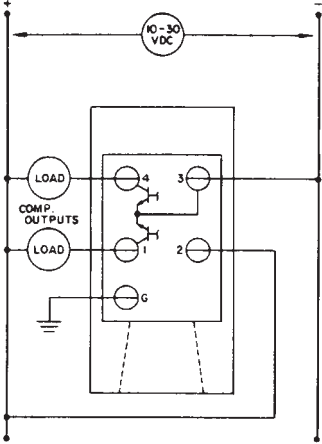
Catalog Listing	MPS31HD	MPS32HD	MPS33HD
Style	4-wire DC Dual Output (NPN)**	3-wire DC Single Output (PNP)**	4-wire DC dual N.O. Output (NPN and PNP)**
Input Voltage	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC
Power Dissipation	750 mW max.	750 mW max.	750 mW max.
Current Consumption	25 mA max.	25 mA max.	25 mA max.
Output Type, N.O.	NPN Open collector	PNP Open collector	NPN, PNP Open collector
Load Current	250 mA each output	250 mA	100 mA max. each output
Load Voltage	5 to 30 VDC	5 to 30 VDC	5 to 30 VDC sinking, 10 to 30 VDC sourcing
Voltage Drop	1.0 VDC max. at rated load	1.0 VDC max. at rated load	0.8 VDC max.
Off-State Leakage Current	10 μAmps	10 μAmps	10 μAmps
Electrical Protection	False pulse, line transients, reverse polarity		Reverse polarity, short circuit

MECHANICAL/ENVIRONMENTAL SPECIFICATIONS, ALL BASES

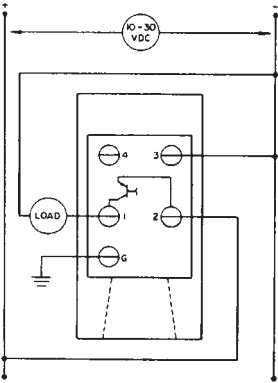
Temperature	Operating: -30 to +70°C (-22 to +158°F) Storage: -55 to +85°C (-67 to +185°F)
Shock	50 G
Vibration	10 G, 10 to 500 Hz
Humidity	95% RH, non-condensing
Sealing	NEMA 1, 3, 4, 12, 13 when all components are properly assembled
Base	Glass-filled polycarbonate
Base seals	Buna-N
Cable	PVC

WIRING DIAGRAMS

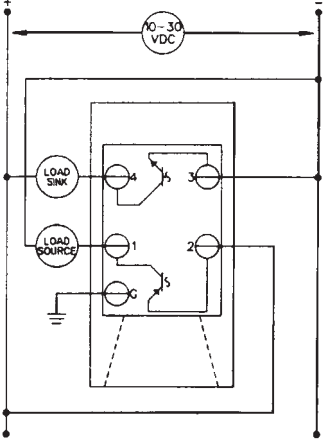
MPS31HD Current Sinking



MPS32HD Current Sourcing



MPS33HD Current Sinking and Sourcing



Modular Harsh Duty Limit Switch Style Sensors

Mini Bases

AC MINI BASES

Catalog Listing	Preloaded-Connector	MPT11HD MPT21HD	MPT12HD MPT22HD	MPT16HD
Style		4-wire 110 VAC	4-wire 240 VAC	4-wire 24 VAC/VDC AC/DC Output
Input Voltage		92 to 132 VAC 50/60 Hz	198 to 264 VAC 50/60 Hz	24 VAC/VDC $\pm$ 10% 50/60 Hz
Power Dissipation		10 VA max.	20 VA max.	2 VA max.
Current Consumption		70 mA max.	70 mA max.	70 mA max.
Output Type, N.O		S.S. AC relay	S.S. AC relay	Bilateral FET
Load Current		5 to 500 mA*	5 to 500 mA*	100 mA up to 50°C derated linearly to 20 mA at 70°C
Load Voltage		5 to 350 VAC	5 to 350 VAC	300 VAC/VDC max.
Load Surge Current		12 Amps max. for 16 msec	12 Amps max. for 16 msec (non-repetitive)	250 mA for 8 msec (non-repetitive)
Voltage Drop		1.2 VAC max. at rated load	1.2 VAC max. at rated load	3 V max. at 60 mA
Off-State Leakage Current		1 mAmp max.	1 mAmp max.	10 μ Amp max.
Electrical Protection		False pulse, line transients		

*Derated linearly to 0.4 Amp at 70°C (158°F). Max. dv/dt 600 V/ μ sec.

**NPN – current sinking. PNP – current sourcing.

MINI BASES

Catalog Listing	Preloaded-Connector-	MPT17HD MPT27HD	MPT31HD MPT41HD	MPT32HD MPT42HD	MPT33HD
Style		4-wire 110 VAC AC/DC Output	3-wire DC Single Output (NPN)*	3-wire DC Single Output (PNP)*	4-wire DC Dual N.O. Output (NPN and PNP)*
Input Voltage		92 to 132 VAC 50/60 Hz	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC
Power Dissipation		10 VA max.	750 mW max.	750 mW max.	750 mW max.
Current Consumption		70 mA max.	25 mA max.	25 mA max.	25 mA max.
Output Type, N.O.		Bilateral FET	NPN Open collector	PNP Open collector	NPN, PNP Open collector
Load Current		100 mA up to 50°C derated linearly to 20 mA at 70°C	250 mA each output	250 mA	100 mA max. each output
Load Voltage		300 VAC/VDC max.	5 to 30 VDC	5 to 30 VDC	5 to 30 VDC
Load Surge Current		250 mA for 8 msec (non-repetitive)			
Voltage Drop		3 V max. at 60 mA	1.0 VDC max. at rated load	1.0 VDC max. at rated load	0.6 VDC max.
Off-State Leakage Current		10 μ Amps max.	10 μ Amps	10 μ Amps	10 μ Amps
Electrical Protection		False pulse, line transients	False pulse, line transients, reverse polarity, short circuit (MPT33 only)		

* NPN – Current sinking. PNP – Current sourcing.

INTERFACING WITH PLCs

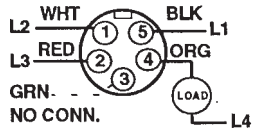
Bilateral FET output devices (MPT16HD and MPT17HD) are recommended for interfacing with PLCs, particularly where the holding current may drop below the 5 mA threshold required for conduction of the solid state relay.

Modular Harsh Duty Limit Switch Style Sensors

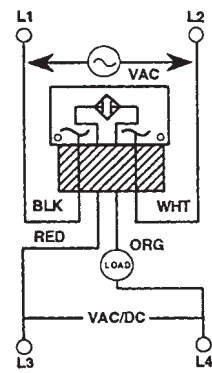
Mini Bases

WIRING DIAGRAMS

MPT11HD/12HD/15HD

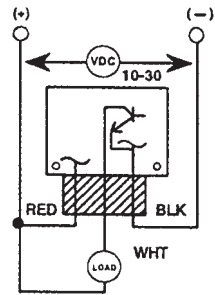


MPT16HD/17HD AC/DC Output

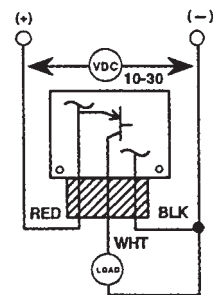


DC WIRING

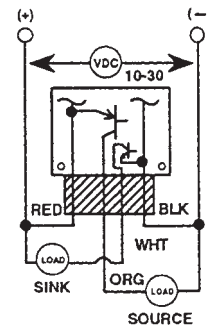
MPT31HD NPN (Sinking)



MPT32HD PNP (Sourcing)



MPT33HD NPN/PNP (Sinking and Sourcing)

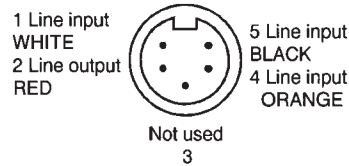


QUICK-CONNECT CABLES

	Catalog Listing	
	6'	12'
4 pin	41108	41109
5 pin	41307	41308

PINOUTS

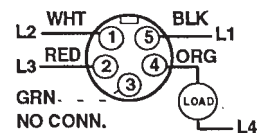
AC Output Bases MPT21HD, MPT22HD



DC Output Bases MPT41HD, MPT42HD



MPT27HD Wiring



Modular Harsh Duty Limit Switch Style

3, 4-Wire DC, 3, 4-Wire AC Types

PLUG-IN RELAY BASE SPECIFICATIONS

Catalog Listing	MPV11HD	MPV12HD	MPV13HD	MPV31HD
Input Voltage	103 to 132 VAC 50/60 Hz	192 to 264 VAC 50/60 Hz	22 to 26 VAC 50/60 Hz	10 to 30 VDC ± 10%
Power Dissipation	10 VA max (including relay coil)	18.5 VA max.	2 VA max.	0.5 VA max.
Current Consumption	70 mA max.	70 mA max.	70 mA max.	30 mA max.
Output Type	SPDT relay, UL recognized			
Replacement Relay	MPZR01			
Load Current	6 Amps @ 24 VDC or 120-300 VAC			
Response Time	10 msec ON, 10 msec OFF, max.			
Relay Life	20,000,000 operations (no load); 100,000 operations (full load)			

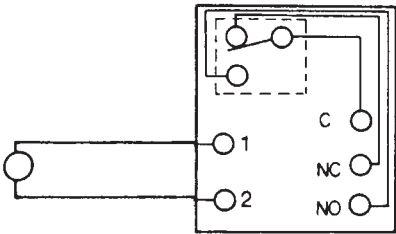
MINI RELAY BASES

Catalog Listing	Preleaded-Connector	Front/Back Head Mount	Right/Left Head Mount
		MPW11HD	MPW51HD
		MPW21HD	MPW61HD
Input Voltage		93-132 VAC 50/60 Hz.	
Power Dissipation		10 VA max. (excluding load)	
Current Consumption		75 mA max.	
Output Type		SPDT relay, UL recognized (1 Form C)	
Contact Rating		Max. switched power: 210 Watts (DC) or 1750 VA (AC) Max. switched current: 6 Amps Max. switched voltage: 125 VDC or 380 VAC	
Contact Material		Silver	
Response Time		10 msec ON max. 10 msec OFF max.	
Relay Life		50,000,000 Operations (No Load) 100,000 Operations (Full Load)	
Electrical Protection		False pulse, Line transients	

Proximity

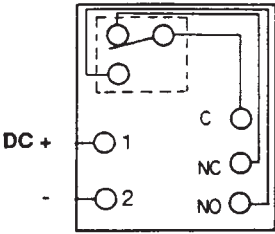
RELAY BASE

MPV11HD, MPV12HD, MPV13HD



RELAY BASE

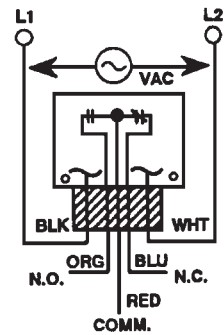
MPV31HD



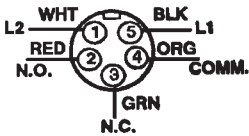
TYPICAL MINI RELAY BASE WIRING

WIRING DIAGRAM & PINOUT

MPW11HD, 51HD Mini Relay Base



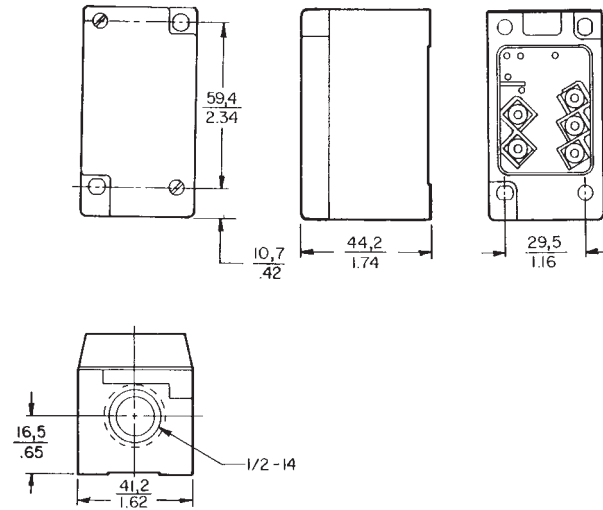
MPW21HD, 61HD Mini Relay Base



Modular Harsh Duty Limit Switch Style Sensors Mini Bases

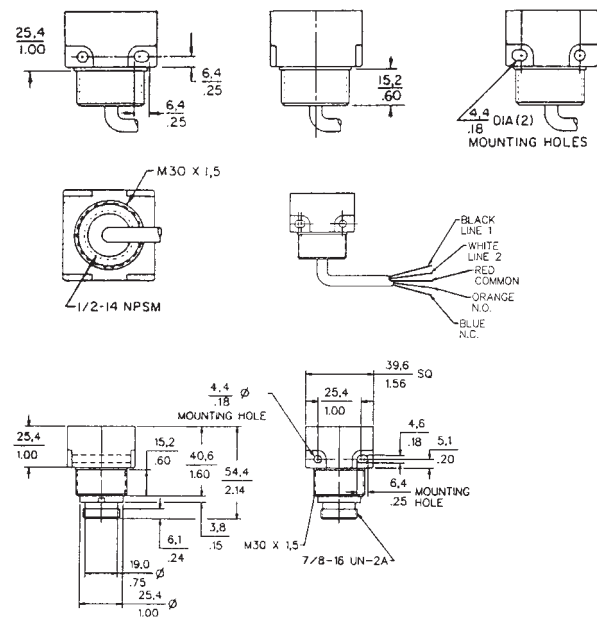
PLUG-IN BASE

MOUNTING DIMENSIONS (For reference only)



MINI BASE

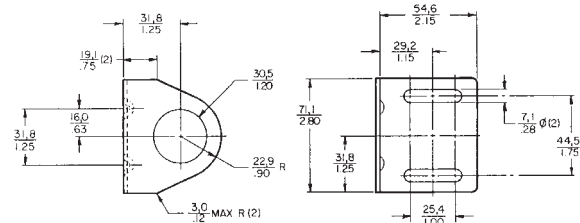
MOUNTING DIMENSIONS (For reference only)



MOUNTING BRACKETS

Base and receptacle components are wired and mounted using conventional limit switch mounting hardware. An optional mounting bracket, FE-MB11, may also be used. The bracket allows the unit to rotate 360°. Plug switch body/proximity head in for quick installation or replacement.

MPZB01



MPZB02

